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**Sirtuins: critical regulators at the crossroads between cancer and aging.**

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**Public Summary:**

**Scientific Abstract:**

Sirtuins (SIRT1-7), or class III histone deacetylases (HDACs), are protein deacetylases/ADP ribosyltransferases that target a wide range of cellular proteins in the nucleus, cytoplasm, and mitochondria for post-translational modification by acetylation (SIRT1, -2, -3 and -5) or ADP ribosylation (SIRT4 and -6). The orthologs of sirtuins in lower organisms play a critical role in regulating lifespan. As cancer is a disease of aging, we discuss the growing implications of the sirtuins in protecting against cancer development. Sirtuins regulate the cellular responses to stress and ensure that damaged DNA is not propagated and that mutations do not accumulate. SIRT1 also promotes replicative senescence under conditions of chronic stress. By participating in the stress response to genomic insults, sirtuins are thought to protect against cancer, but they are also emerging as direct participants in the growth of some cancers. Here, we review the growing implications of sirtuins both in cancer prevention and as specific and novel cancer therapeutic targets.

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